Spring

Summer

Autumn

Winter

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YOSEMITE

NATURE NOTES

UME XXXVII - NUMBER 10 OCTOBER 1958

—*Anderson, NPS*

Autumn in Yosemite.

In cooperation with the National Park Service.

—Anderson

Storm over Tuolumne Meadows.

YOSEMITE

Nature Notes

in its 37th year of public service. The monthly publication of Yosemite's park naturalists and the Yosemite Natural History Association.

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L. XXXVII | *OCTOBER 1958* | *NO. 10*

A RAIN HIKE IN THE HIGH SIERRA

By Allen Shields, Ranger-Naturalist

'he admonition, "He doesn't know ough to come in out of the rain" 1 now be changed to read "He ows enough to go out in the rain." unting the naturalist, 13 people rned more about themselves and lumne Meadows by hiking in the 1 than they had thought possible ore it happened.

'he rain, snow, and hail had been ning down for almost an hour be- e the time scheduled for our geol- hike. The naturalist arrived at Tuolumne Meadows Information tion ready to go back to his tent, e that no one would be going the hike. Inside the station were a people looking at copies of *emite Nature Notes* and talking etly, glancing occasionally out of windows to see what the weather s doing. It was doing its worst.

Anyone for the geology hike?" ell, I guess so," someone answer- Twelve people walked out into heavy downpour, wet before en- ng the three cars for the ride n the meadows to the first stopping point. Lightning and thunder urged the rain in greater intensity as the naturalist slogged across the meadow to the glacial polished granite surface. Twelve people hunched their shoulders against the cold and listened to a rapid resume of 200 million years of geologic history, felt the polished surface, looked at Ragged Peak, Unicorn, Lembert Dome, Johnson Peak, and heard about glacial evidences that were obscured by the storm clouds. Through a sudden break in the cloud waves, Erratic Dome showed itself—looking very wet—for our final objective. As the group plop-plopped its way back to the cars, Sierra shooting stars and Yosemite asters looked particularly brilliant against the water-filled meadow where Brewer blackbirds and Cassin's finch were feeding.

Our second stop was made at Pothole Dome at the end of the meadow. The storm's full fury was whipping the meadow grasses, filling the small stream to overflowing—and all feet

became wet. On the dome sides we could see for the first time how streams and rivulets contribute to weathering, where lichens are more likely to grow and begin their timeless process of making soil. The climb up the side was made through a stream that had come into being as we watched. Wind sounds and thunder helped us to realize what weather can do to a granite surface.

By the time all had returned to the cars, no one could claim many square inches of dry area, and all were thoroughly cold. Upon reaching the parking place for the third stop only a couple or two called it quits. The wonder was that more didn't go back then. It was now that our rewards started coming, one after another, for we had a whole series of experiences that are completely missed during routine weather in the high Sierra.

Morainal ponds were strangely new under the pelting rain, patterned with lace. Hemlocks heavy with water became more lanquid than we had ever seen. Cones of lodgepole and hemlock by the hundreds of thousands were swelling closed, while dry cones near the bases of trees stayed open, teaching their own secret lessons. Bear trails that were normally difficult to fi showed very clearly as small rou puddles. Strange fungi and mus rooms rarely seen were fairly sprir ing up from the forest duff. On t dome we had our greatest insig for high above the meadows were part of the clouds, at the sa time we were a part of the rc surface. The wind whipped at driven full force from Half Dor barely visible under the lip of huge cloud. Fog and scudding clou helped us to experience one cor tion of weather in an unusual w The entire Tuolumne Region var a changed aspect as clouds revea and obscured all in an ever-cha ing scene.

Thoroughly wet, chilled and ins ed, we descended and "squish our way back. Just before enter our cars, we stopped to admire a pine, jeweled by large drops of r now subsiding. One woman rem ed, "Lupine wears its water so m more beautifully than we do." looked at each other. Rarely hav seen a more bedraggled bunch people or a more satisfied one, we had received much more than had a right to expect by doing gether, in high spirit, what indiv ally we would probably have ne done alone.

PROSPECTING FOR TOADS

By Ernest L. Karlstrom, Ranger-Naturalist

\ Civil War tune with folk ballad .cs has been popular with Yosem- ranger-naturalists for many ırs:

I've wandered all over the coun-
try
rospecting and hunting for gold"

his song, with a slight change in rds, has been my theme as I nped, Geiger counter in hand, oss a Sierran meadow in search radioactive toads. Field biology come of nuclear age. Previous estigators have used radiosotopes studies of movements or food its of such diverse animals as quitoes, click beetles, plovers, l voles and moles. As one means gaining information, the writer adopted the method to the study ne Yosemite toad (*Bufo canorus*) ıpying Dana Meadows just out- the east border of Yosemite Na- ıl Park (1).

pecial tags containing the rela- y "hot" Cobalt-60 were designed placement under the toad's skin. ium-sized fisherman's split lead hollowed out by drill, were l with the isotope solution and shot flattened with heavy pliers aspirinlike capsules. Application veral coats of plastic insured a oth surface which would protect animal from possibly injurious ts of the lead. (Work of this na- should be carried out only at a gnized center of research such as a university because of the special equipment and methods necessary for handling radioactive materials. The isotope should never come in direct contact with the skin, and the researcher should wear a dosimeter to record his accumulated exposure to radiation.) For my protection and to prevent exposure of my camera film, the ready-made capsules were transported to the study area in a lead bottle.

Implanting the tags was a quick and simple procedure. An incision was made in the loose skin on the upper surface of the toad, the capsule inserted with forceps and slipped beneath the skin to the underside. Except for a slight bulge in the nether region, the tagged toads hopped nimbly on their way. Later recovery of animals showed that the skin knitted within a matter of weeks with barely a trace of the surgeon's cut.

Geiger counters and the much more sensitive scintillometer were used in later prospecting for the critters. The searching technique involved criss-crossing over the meadow area with the sensitive receivers dangled close to the ground. A rapid staccato of clicks or the bounce of the meter needle was the signal to start digging.

There were several reasons for attempting the radioactive tagging method. The Yosemite toad lives

only at relatively high elevations—6,400 to 11,300 feet—in the central Sierra. Because of cold nighttime temperatures the animals are forced to be active during the day (most toads are nocturnal) and find cover at night to prevent freezing. I was interested in finding exactly where they retreated at night and at what temperatures they would reappear during the day. A second point was to attempt recovery of the animals in their winter hibernation sites.

A total of 63 Yosemite toads were unceremoniously loaded with the capsules during the summer of 1955. During subsequent visits to the meadow in 1955 several "strikes" were made. Tagged toads were detected in their subterranean haunts, rodent burrows 3-6 inches below the meadow surface. It was a strange and exciting experience to be tracking a moving animal which was completely hidden from my senses yet "audible" to the Geiger counter. By digging up animals and recording their body temperatures with a small bulb thermometer I found that these so-called cold-blooded animals consistently appeared on the surface when they and the environment warmed to 46-48° Fahrenheit. Amphibians are not necessarily cold-blooded but variable in their temperature. By mid-afternoon, after basking in the Sierran sun, Yosemite toads might register temperatures of 80-85° F. No tagged toads were discovered in hibernation, but one radioactive capsule minus its bearer was excavated from a depth of 15 inches in meadow sod. This suggests that the animals may escape the rigors of Sierran winters by retreating underground to considerable depths.

How long can the toads survive

Yosemite Toad. —Anderson, N

with their radioactive cargo? The retical calculations of the amount poisoning radiation received by the vital organs would lead one to pr dict death in a matter of month Such is not the case! On July 2 1956, a full year following taggin two "hot" toads were recovered. T big surprise, however, occurred th summer when again, scintillome over my shoulder I began prospect for toads. At noon of July 3, hundre of breeding toads were active in t meadow, the males calling their bi like trills and chirping excitedly they jostled one another in sear of the fewer females. My chief ass tant, five-year old son Kris, and began grabbing every toad in sig In approximately one hour we c lected 149 adult animals which stored temporarily in a carton b Each toad in turn was brought cl to the sensitive instrument to de mine possible radioactivity. F normal-appearing, active males r istered from "warm" to "hot". T which had retained the tags g off rays readily detectable at a tance of about three feet; the oth had lost their capsules but caused an abrupt rise of the ind tor needle due to apparent assim tion of some of the radiosotope. vival for three years is a definite

ion that long-range studies can be de of amphibians using this thod. Because Cobalt-60 has a g half-life of 5.3 years (i.e., the ope loses one-half its original rgy in that time), it is possible t radioactive toads may be re-ved in years ahead.

Discover any uranium?" you ht ask. Yes, several small pock- of soil containing naturally radio-ve material (possibly uranium) e found. After careful excavation, source (nothing to excite the mic Energy Commission) was ed to several handfuls of soil. sibly the material had been hed out of the metamorphic rocks at higher elevations and been deposited in highly localized pockets along the meandering meadow rivulets. Considerable energy was wasted in digging for toads not there. But then the miners also had their "fool's gold."

The high point for this old toad prospector is yet to come. I can picture myself bent over my instrument in Dana Meadow. Coming up behind me will be an avid uranium hunter or otherwise curious character. To his insistent question, "What are you finding?" I can reply, "Toads". Then I'll want to see his face.

(1) See *Ecology*, vol. 38, no. 2, April, 1957.

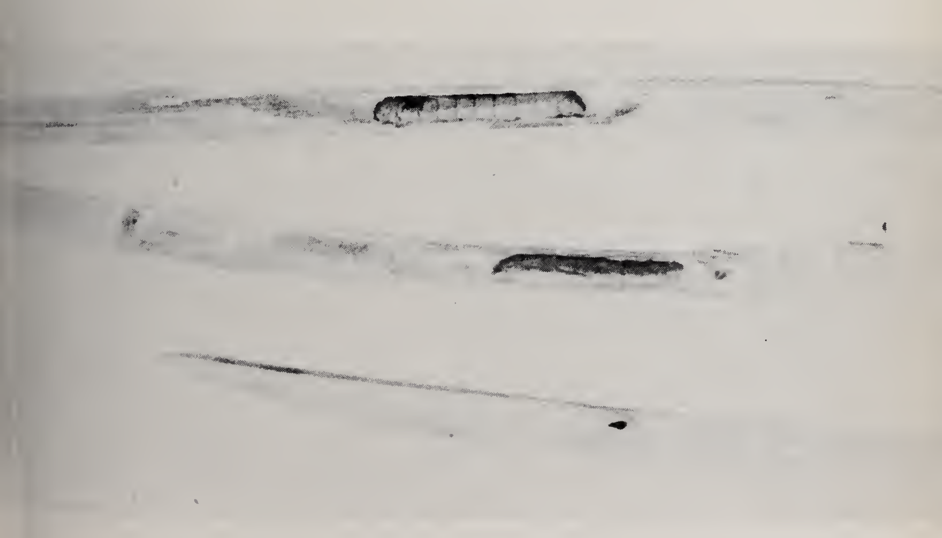
Dana Meadow —*NPS*

A needleminer infestation before 1920 near Tenaya Lake has resulted in a "ghost forest" of lodgepole pines.

THE SCOURGE OF TUOLUMNE

By David Essel, Ranger-Naturalist

Vith over 50,000 acres heavily in-
ted and the needleminer moth
eading its devastation among the
gepole pine forests at the rate of
out two miles every flight period,
cern has increased about an ef-
ive control of this tiny insect.
luch public pressure is being ex-
ed toward a satisfactory solution
his insect plague that promises to
ke much of the high country of
semite into a ghost forest, as it did
lier in the century, around 1916.
h our civilization expecting men
cience to be able to come up with
nediate answers, it comes as a
prise to find that to work out a
ition to the problem, the entomol-
sts would possibly require a ten
r period for their investigations.
s was back in 1953. Much work
been done in the slow, painstaking, precise way of the scientist. Their aim? To understand the biological nature of the needleminer moth so well that they can intelligently prescribe treatment where and when the need arises. Yes, an immediate solution if possible. But then this problem of the needleminer is by no means new; it's been here for hundreds of years. In the past it has solved itself by the very simple process of the moth literally eating itself out of house and home. With the death of the trees and no more succulent needles to eat, the moth population is wiped out. Then what? Well, George R. Stuble who is in charge of research at Tuolumne Meadows says nature has endowed the lodgepole with an extremely large reproductive capacity. So the tiny seeds and seedlings commence the slow



—*Anderson, NPS*

Needleminer larvae at work.

A helicopter was used to spray a solution of malathion in diesel oil over infested areas.

process of growing a new forest to cover our mountains. This is what will have to happen in the Conness basin, Glen Aulin and the Virginia basin, the basins of Dingley and Delaney Creek, as well as around Cathedral Lake. These forests are destined to become ghosts. Tall skeletons of trees whose bases will slowly be invaded by the fungi, and carpenter ant; whose trunks will furnish nests for the whiteheaded woodpecker. The rumor that the forests will be changed in type from lodgepole pine to the mountain hemlock is unfounded. The lodgepole seedlings will again produce the tall, straight thin-barked trees of Tuolumne Meadows. But won't the seedlings also be eaten by the larvae? By some phenomena, mainly climatic, the tiny seedlings usually escape their ravages.

What about the needleminer itself?

Well, it's a tiny silvery-brown mo
less than a half inch long whi
spends most of its two year life cy
as a tiny pink caterpiller inside t
needles of the lodgepole pi
Emerging, it lives only about
month as an adult moth. After m
ing the female lays her eggs on t
scaly bracts along the stems. In ne
infestations the larvae that hatch e
hibit characteristic behavior p
terns—migrating to the oldest ne
dles first, eating their way throu
and then, upon finishing their fi
needle, they crawl to the very
of the growing branch to attack t
newest whorl of the 60 or so needl
the lodgepole pine puts out ea
year. When this happens the tre
have a scorched appearance,
though fire had gone through t
area. Later on in the fall of 19
these newly infested areas (Ly
Rafferty Creek, Gaylor Lakes tr

ll look ghostly, but the larvae
en't finished because each has a
al of about five needles to eat
ough before they achieve adult-
od. From the tender new needles
y migrate down the branch
vards the older needles again.
m about mid-July to October this
ging occurs, the larvae molting
e times in the process. They re-
in over winter in the needle in
ich they happen to be working in
tober of the even numbered years,
n emerge as moths the next year
d years) to mate and lay eggs. It
hen that the spreading of the in-
tation occurs. Usually the moths
nain in the immediate vicinity, but
entle breeze of 5-12 miles per hour
l waft the moths to a new area.
a strong gusty wind, the little in-
ts cling to the branches for dear
, going nowhere. For many years
west side of Tenaya Lake has
nained clear of the needleminer,
ile the east side has been hit re-
itedly. Then, in 1955-57 the air
rents reversed themselves, per-
ps only for a few hours one night
en the moths were flying, and
west side was infested. Lucky for
semite, the prevailing winds are
n the west, for just to the south of
no Lake is a lodgepole needle-
ner that flies in even years and
nains over winter in the needles
he odd years—just the opposite
Yosemite's variety. It may be an-
er species, and the chances are
n that they will get into the area,
prevailing winds, the mountains,
strip of desert between, all pre-
ting.

he new infestations, Lyell Can-
, Rafferty Creek, and Tuolumne
ld be saved if an effective spray
gram could be begun soon. But
e the keyword is "Effective". In

—Anderson, NPS

Lodgepole Pine.

the early days of DDT, it was tried with little or no effect. Since then many sprays have been used on test areas, but results still do not measure up to the 75 per cent effective mark the scientists are shooting at. This summer a crucial test using malathion in diesel oil sprayed from a helicopter was conducted while the larvae were very tiny, and while encouraging, the percentage of kill was not satisfactory, at least for use at this particular stage of the larval growth. Later on when the larvae are larger more tests will be tried. While Mr. Struble is concentrating on effective evaluation of needleminer damage and the use of chemical insecticides, his associate, Dr. A. D. Telford, is studying the 40 different genera of insect enemies that closely associate with the larvae. There are 7 species that positively are parasites, including one wasp-like creature that lays its eggs on the eggs of the needleminer. A virus has been found, too, of the granulosis type, which attacks the internal cellular structure, liquidating the interior. In 1953 biological controls by the virus were thought to be a good possibility, but they have not yet proven effective. One big item hinders the work of the investigation—it takes 2 years from egg to adult. Thus, one cannot investigate any particular stage of the life cycle one may wish but instead must patiently work away as the seasons come and go. Biological control is an effective method of combating many harmful insects, however. For example much money and effort were saved by investigating the extent to which parasite control of the spruce budworm was effective in an area where this destructive pest was found. The entomologists sprayed only the area where parasite activity was inadequate. In this way thousands of acres were eliminated from the spray program.

Spraying appears to be the most promising control method, and probably this fall malathion spraying with a ground mist blower will occur in camping areas and along the roads of Tuolumne. In 1959 and 196 an extensive spray program against the moths themselves may be tried.

Whatever the immediate success or failure of control programs, the cooperative research of the National Park Service, the U. S. Forest Service and the University of California at the research center in Tuolumne Meadows will point the way toward future effective control over one of the ravages of our high sierra forest.

(*From an interview July 24, 195 with Dr. George Stuble and Dr. Telford.)

Dead Lodgepole Pines.

—*Ernst. N*

OLD INITIALS

By John C. Preston, Superintendent

· three days recently, August
; and 17, along with others (Mrs.
· Tresidder, Mrs. Lucy Butler,
ınd Mrs. Hilmer Oehlmann, and
Preston), I camped on the shore
ə Upper Cathedral Lake. Mrs.
ıder had established camp
the previous Wednesday.
Thursday, August 14, Mrs. Tre-
r and Mrs. Butler, and the pack-
r. Malcolm Fulmer, rode down
unrise Trail towards the Valley.
t two miles from the lake they
ıe trail and bearing right, rode
letely around what is now
n as Tresidder Peak. On their
down at a point approximately
feet from the west shore of the
ınd perhaps 500 feet above the
evel, and at the right of the in-
the lake as you face Tresidder
Mr. Fulmer discovered initials
d in the bark of a lodgepole

following day with Mrs. Butler
Mrs. Preston, Fullmer and I
to the location. The tree is apt-
nately two feet in diameter. The
ıg is obviously very old and as
I know has never been prev-
reported. The initials were
" or "NAT" and below them
bark had partially grown over
st initial).
ɔ was MAT (NAT) and what
e doing well above the upper
dral Lake 72 years ago? It's
dy's guess. Perhaps just enjoy-
ə beautiful countryside as we
loing.

—*Ersst, NPS*

Initials, dates, and symbols are found on many trees throughout the park. This tree has them all!

OUT OF YOSEMITE'S PAST

A One Picture Story

FIRST AIRPLANE TO LAND IN YOSEMITE VALLEY

In variance with present-day modes of travel is the pioneer trip b to this region. On the morning of May 27, 1919, Lieut. Krull of the U. S. A after a previous inspection of the Valley in which he passed upon the ticability of the flight, hove into sight over Sentinel Rock at an elevati 7000 feet. Following a series of descending turns to 500 feet he swept the valley from the vicinity of Washington Column to land in Leidig dow. Within a few years one or two planes repeated this performance. ing at less than 2000 feet elevation is now prohibited over all national p

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—*NPS*

Storm over Half Dome